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[54] **DRINK DISPENSER HAVING A PIVOTED LIQUID SUPPLY TANK INCLUDING A PLUG-IN CONNECTOR ASSEMBLY**

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[52] **U.S. Cl.** **137/408**; 141/352; 222/64; 222/160

[58] **Field of Search** 141/352; 137/408; 285/231; 222/41, 52, 58, 64, 65, 66, 77, 160, 164, 166

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Primary Examiner—Kevin P. Shaver

[57] **ABSTRACT**

The storage tank for providing liquids to a unit further processing these liquids comprises in its bottom area a plug-in connection for a drawing unit, and in the area of this elastically designed plug-in connection, a pivot bearing is placed offset to the centroidal axis of the storage tank and relative to the centroidal axis, an elastic block with an evaluating element is placed relative to the pivot bearing.

16 Claims, 1 Drawing Sheet

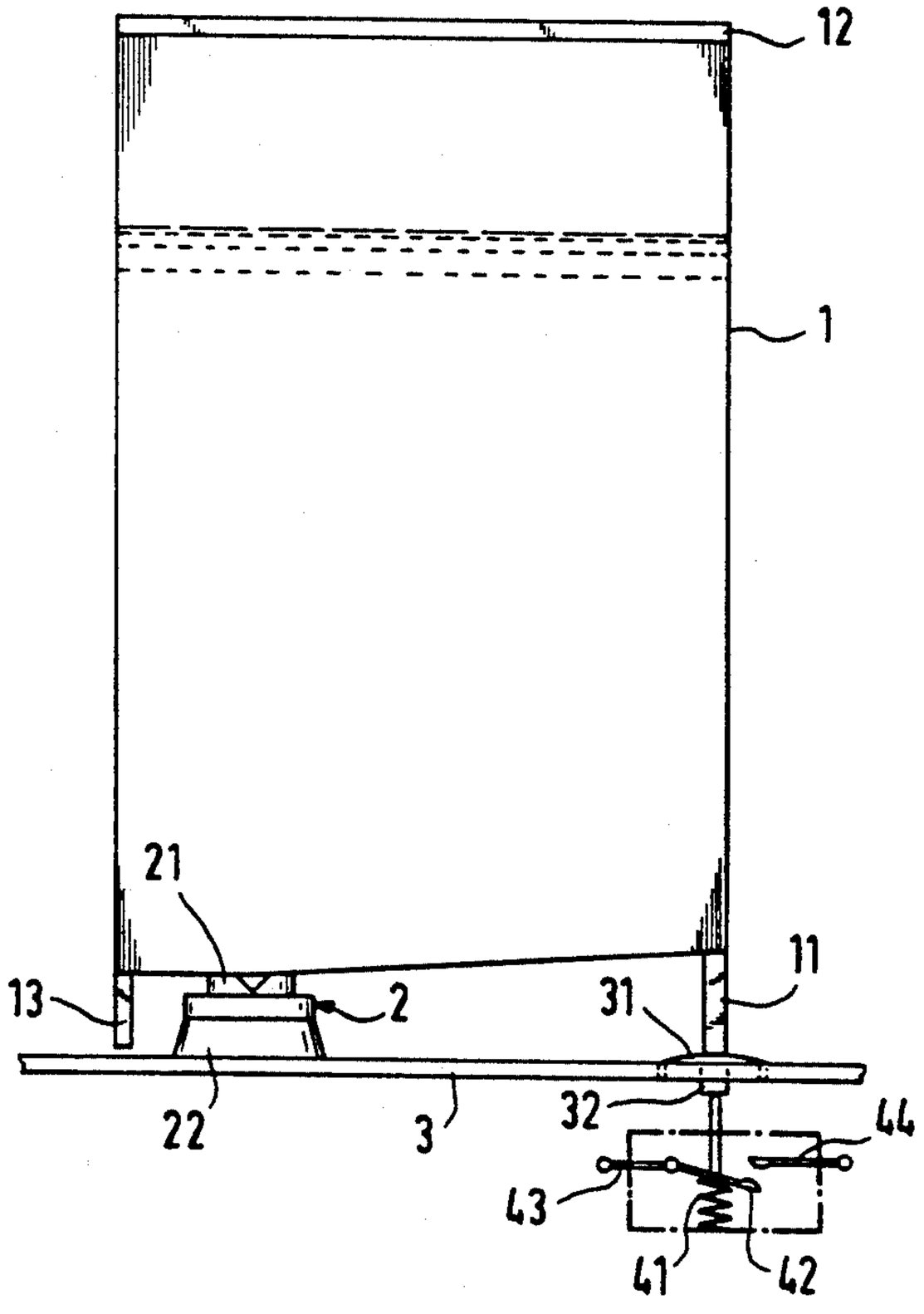

Fig.1

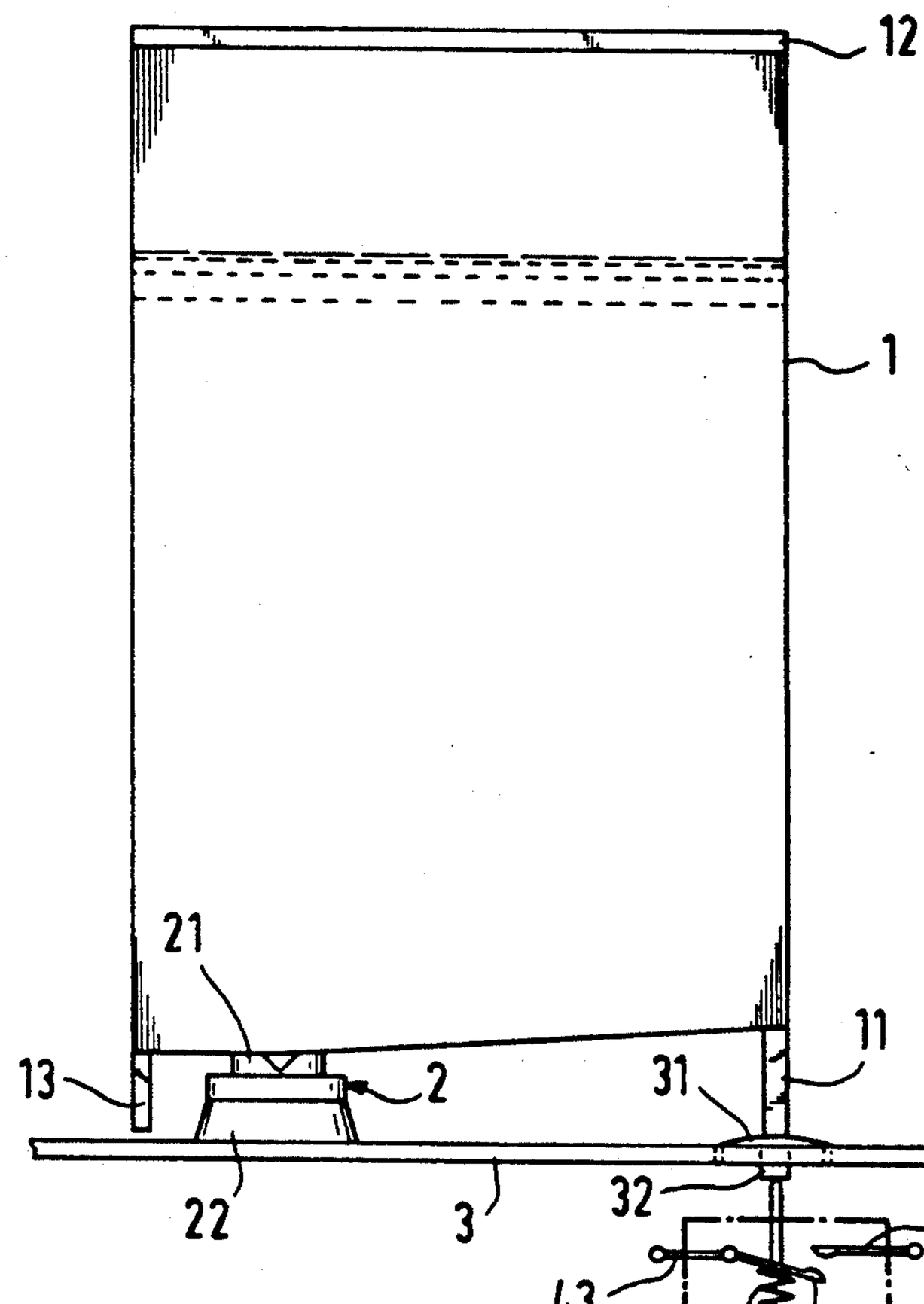
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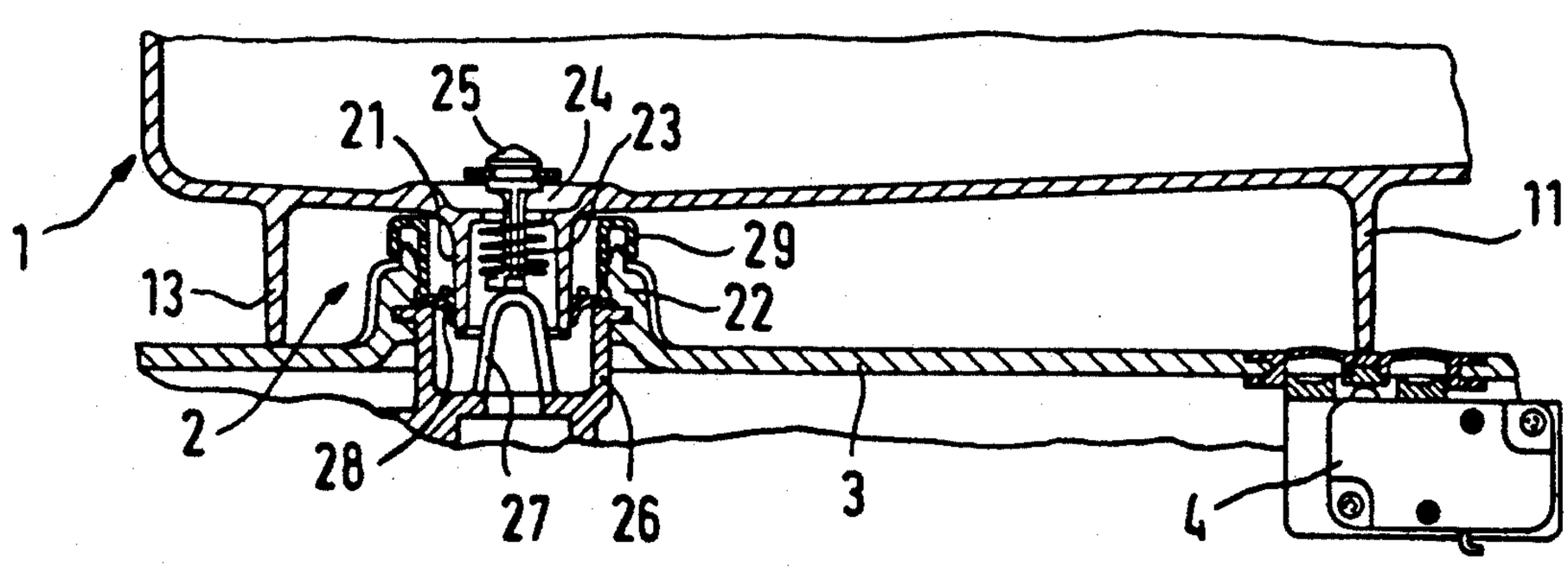
Fig.2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DRINK DISPENSER HAVING A PIVOTED LIQUID SUPPLY TANK INCLUDING A PLUG-IN CONNECTOR ASSEMBLY

BACKGROUND OF THE INVENTION

The invention relates to a tank for storing liquids and a device for drawing the liquids from this tank for further use, especially a water supply tank in a drink dispenser and a water-drawing device, in which the tank comprises in the bottom area a plug-in connecting part containing a valve, which can be connected to draw the liquid with a plug-in connecting part integrated in a support surface, over which the stored liquid can be conveyed.

Drink dispensers, which produce refreshing drinks from one or more drink concentrates and from carbonated water, can obtain the water necessary for the production of drinks directly from a water pipe connected with the dispenser. As an alternative for this purpose, drink dispensers can be supplied with water from a storage tank, for example, in the cases in which there is no water main at the site of the drink dispenser or if the quality of the water that can be drawn from the water main does not meet the special requirements for the drink to be produced.

In drink dispensers, which are supplied with water or with a drink concentrate from a storage tank, a troublefree operation depends on the fact that in each production step, sufficient amounts of the initial substances can be drawn from the storage tank.

SUMMARY OF THE INVENTION

The object of the invention is to indicate a storage tank with a drawing device of the type mentioned above, which makes possible a troublefree operation with the decreasing amount of the liquid stored in the tank.

The invention is distinguished by multiple advantages. The tanks of the drink dispensers according to the invention comprise only a plug-in valve assembly as well as an electric switch. The switch is used to turn off the drink dispenser when the amount of the stored liquids in the tank reaches a critical value assembly. Both components, valve and switch, are standard products, which can be adapted without a special matching. They interact in a simple way and assure a troublefree mode of operation.

The tank is connected in a detachable manner with the drink dispenser, so that the tank can be removed in a simple way from the drink dispenser and be refilled with the respective liquid to be stored.

An advantageous embodiment of the invention is characterized in that the tank comprises an adjusting foot on its underside, which acts on the switching contact piece of the switch. The foot concentrates the pressure starting from the tank including the respectively contained amount of liquid to an area at the tip pointing downward and thus imparts the pressure in a defined way.

According to another embodiment, the drink dispenser comprises a sealing membrane with a ram in the area of the end of the foot, which imparts the pressure starting from the foot to the switching contact element. This embodiment is distinguished by a double protection; the interior space is protected from impurities by the sealing membrane and the switching contact element of the electric switch is protected from otherwise

possible damages by the foot when the tank is attached to the drink dispenser.

According to another advantageous embodiment of the invention, the switch is designed as a spring-controlled switch. With it the switch moves the tank only when reaching a certain filling level and thus when reaching a critical pressure value, while before this moment, with the amount of liquid decreasing, the tank is not changed in its position. The spring-controlled switch thus imparts stability to the storage tank. Fluctuations of the liquid in the tank and the tank itself thus do not influence the interaction of the tank and the drink dispenser.

According to another embodiment of the invention, the interior space of the tank is designed flat on its underside so that the surface from the area of the pin drops to the area of the valve. By this configuration of the tank, the pivoting of the tank around the fulcrum is supported in the valve.

Another advantageous embodiment of the invention is characterized in that the switch comprises a second switch position, which the switching contact piece produces when reaching a preset second tank pressure. The switch then triggers an alarm in its first switch position, which indicates the supply in the tank coming to an end, while in the second switch position, the drink dispenser is turned off.

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus, are not limitative of the present invention and wherein:

FIG. **1** is a diagrammatic view of a tank superposed in a drink dispenser; and

FIG. **2** a detailed view of the arrangement in the bottom area of the tank.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. **1** shows a tank **1** for storing water for use in a drink dispenser. Tank **1** is located on a support surface **3** of the drink dispenser and thus is brought into connection with the drink dispenser. Tank **1** is preferably designed in the shape of a parallelepiped and can be closed by a removable cover **12**. The liquid stored in tank **1** is delivered into the drink dispenser by a plug-in connection assembly **2** containing a valve.

The plug-in connection assembly **2** containing the valve, which is described in more detail based on FIG. **2**, consists of two parts **21** and **22** which can be plugged into one another. A first valve part **21** is placed on the underside of tank **1** and a second valve part **22** is placed in the support surface **3** of the drink dispenser. The valve of the assembly **2** is opened by plugging in tank **1** and closed by detaching tank **1**.

The plug-in connection assembly **2** is designed as a pivot bearing and is placed offset to the pivot point of filled tank **1**, so that tank **1** is mounted to swing relative to its central vertical axis on the support surface **3**.

Below tank **1**, preferably inside support surface **3** assigned to the drink dispenser, there is an electric switch **4**, offset relative to the pivot point of tank **1**, and relative to the plug-in connection. The latter comprises a switching contact element **42** that is moveable, in this case, upward (in the direction of tank **1**) or downward, which is mechanically connected to its underside with a return spring **41**.

Tank **1**, mounted to swing in the plug-in connection assembly **2**, presses against this switching contact element **42**. With decreasing pressure, which starts from tank **1** including the stored liquid, return spring **41** presses switching contact element **42** and tank **1** is upward. Tank **1** thus able to swing around the fulcrum provided by the yolk member **27** in the plug-in connection part **22**.

If the force due to weight on the switch starting from tank **1** falls short of a first critical value, spring **41** presses switching contact element **42** of switch **4** in a first switch position, i.e. closes electric switch **4**. The closing of switch **4** is to turn off the operation of the drink dispenser and/or trigger an alarm. This can be implemented, for example, by a relay, not represented in the drawing, which is connected in series with the electrical unit or units of the drink dispenser.

An alternative not represented in the figure can be designed such that the switching contact element **42** closes the switch until the critical pressure value is reached and opens it when this pressure value is reached.

With another switch or a two-stage switch instead of described switch **4**, a second switch position can be achieved, in which the turning off of the drink dispenser is triggered. In the first switch position, an alarm can be triggered, which indicates the supply in tank **1** is coming to an end.

Tank **1** comprises in particular an adjusting foot **11** on its underside, which acts on switching contact element **42**. The length of adjusting foot **11** is to be dimensioned relative to valve part **21** placed on the underside of the tank and optionally additional adjusting feet or supports **13** on the underside of the tank so that tank **1** detached from drink dispenser support surface **3** can safely be set down on a flat surface.

In the embodiment represented in FIG. **1**, support surface **3** includes a sealing membrane **31** with a ram **32**, which transfers the pressure starting from adjusting foot **11** to switching contact element **42**.

Switch **4** is preferably designed as a spring-controlled microswitch switch to impart stability to tank **1** relative to fluctuations of the liquid in the period before reaching the critical pressure value or values.

The interior space of the tank is designed flat on its underside in such a way that the surface in the area of adjusting foot **11** plants downwardly to the area of the plug-in connection assembly **2**. The movement of tank **1** around its fulcrum element **27** of the plug-in connection part **22** is supported by these embodiments.

FIG. **2** shows plug-in connection assembly **2** between storage tank **1** and support surface area **3** in its preferred embodiment. The plug-in connecting elements are configured basically rotationally symmetrical as shown. It can be seen that on support surface **3**, the plug-in connecting part **22** is designed as a pipe socket. There a pipe socket molded on the bottom of storage tank **1** projects upwardly toward the plug-in connecting part **21** of the tank. A poppet valve **25** able to be lifted against the force of a spring **23** upward from a valve opening **24** is located in plug-in connecting part **21** assigned to storage tank **1**. An insert **26** is placed in plug-in connecting part **22** and connected to support surface **3** and includes a dome-shaped yoke **27**. Then, if storage tank **1** is superposed or the support surface **3** and plug-in connecting parts **21** and **22** engages each other, the poppet valve **25** is raised upward by the yoke **27** and as a result, valve opening **24** is opened, so that the water stored in storage tank **1** can flow downward into the area of insert **26**, the area from which it is discharged for further in the drink dispenser or is suctioned off by a feed pump. An elastic sealing element **28** seals both plug-in connecting parts **21** and **22** against one another. By the embodiment of this sealing element **28**, the sealing action is reinforced by the water pressure occurring in this area. The upper edge of the plug-in connecting part **22** connected to support surface **3** is closed with a ring-shaped cap **29** made from elastic material. Storage tank **1** is able to be supported on this ring-shaped cap **29** relative to support surface **3** so that an elastic swivel axis would be formed in this area. In such an embodiment, adjusting foot **13** of storage tank **1** does not contact with support surface **3** as shown in FIG. **1**.

However, with an alternate embodiment as shown in FIG. **2**, this adjusting foot **13** of the storage tank rests on support surface **3**, so that the swivel axis for storage tank **1** is formed at the contact point where the foot **13** touches the surface **3**. By the tilting movement of the storage tank, plug-in connection **2** lying in the immediate vicinity undergoes only extremely slight movements against one another relatively insignificant for their function. The bottom area of storage tank **1** in these cases is not supported or is hardly supported on ring-shaped cap **29** of plug-in connection **22**.

On the side opposite plug-in connection assembly **2** relative to the vertical control axis of storage tank **1**, the storage tank **1** is always supported by the adjusting foot **11** with water-filled condition laterally from the elastic membrane **31** directly on charging surface **3**. Adjusting foot **11** extends—just as adjusting foot **13**—in the direction of the top view of FIG. **2** below storage tank **1**, namely over the opening covered by sealing membrane **31** beyond support surface **3**. First, if storage tank **1** is basically empty, a spring element specific to switch **4** is able to raise the correspondingly substantially emptied storage tank **1** by its adjusting foot **11**, by which also an electrical switching function is made, which is implemented by switch elements **41** and **42**.

The closer the swivel axis for the storage tank is placed to its central vertical axis, the lower the spring power that can be used in the area of the switch.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

What is claimed is:

1. Apparatus for delivering a liquid from a supply tank to a post-mix drink dispenser, comprising:

a supply tank support surface member;

a plug-in valve assembly including a first and a second part, said first part being located in a bottom

portion of the tank and offset from one side of a central vertical axis thereof, said second part being located in an adjacent portion of said support surface member;

a switch actuator located on said bottom portion of the tank and offset from the other side of the central vertical axis;

an electrical switch located adjacent the switch actuator on said support surface member and being actuated by a tilting of the tank about a fulcrum point on said one side of the central vertical axis due to the weight of the liquid in the tank,

said first part of the valve assembly further comprising a normally closed valve including a spring biased valve stem and a bias spring therefor located in a bottom wall of the tank, and a downwardly projecting segment of a pipe surrounding said valve stem and said bias spring;

said second part of the valve assembly further comprising a pipe socket structure for receiving said first part of the valve assembly and including an internal domed shaped yoke, said yoke being operable to open the valve upon contact with said valve stem; and

a sealing element located between said yoke and said pipe segment.

2. The apparatus as defined by claim **1** wherein said second part additionally includes an upwardly projecting ring-shaped cap surrounding said pipe segment for supporting the bottom wall of the tank.

3. The apparatus as defined by claim **2** wherein said sealing element is comprised of elastic material.

4. The apparatus as defined by claim **2** wherein said ring-shaped cap is comprised of elastic material.

5. The apparatus as defined by claim **2** wherein both said sealing element and said ring-shaped cap are comprised of elastic material.

6. The apparatus as defined by claim **2** wherein said tank additionally includes a foot member projecting downwardly from said bottom portion on said one side of the central vertical axis and on the other side of said first and second parts of the valve assembly.

7. The apparatus as defined by claim **6** wherein said fulcrum point is coincident with said first and second parts of said valve assembly.

8. The apparatus as defined by claim **6** wherein said foot is located in a peripheral region of said bottom portion and adjacent said first and second parts of the valve assembly.

9. The apparatus as defined by claim **8** wherein said foot extends to and touches said support surface member.

10. The apparatus as defined by claim **9** wherein said fulcrum point comprises a point where said foot touches said support surface member.

11. The apparatus as defined by claim **1** wherein said switch actuator comprises an adjusting foot peripherally located on said other side of the central vertical axis.

12. The apparatus as defined by claim **11** wherein said support surface member includes a sealing membrane and said adjusting foot couples to said electrical switch through said sealing membrane.

13. The apparatus as defined by claim **1** wherein said electrical switch comprises a spring biased switch.

14. The apparatus as defined by claim **13** wherein said switch comprises a normally closed switch device which is opened by said switch actuator due to the weight of said liquid.

15. The apparatus as defined by claim **13** wherein said switch actuator comprises a foot member projecting from a bottom portion of said tank.

16. The apparatus as defined by claim **14** wherein said switch comprises a microswitch.

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